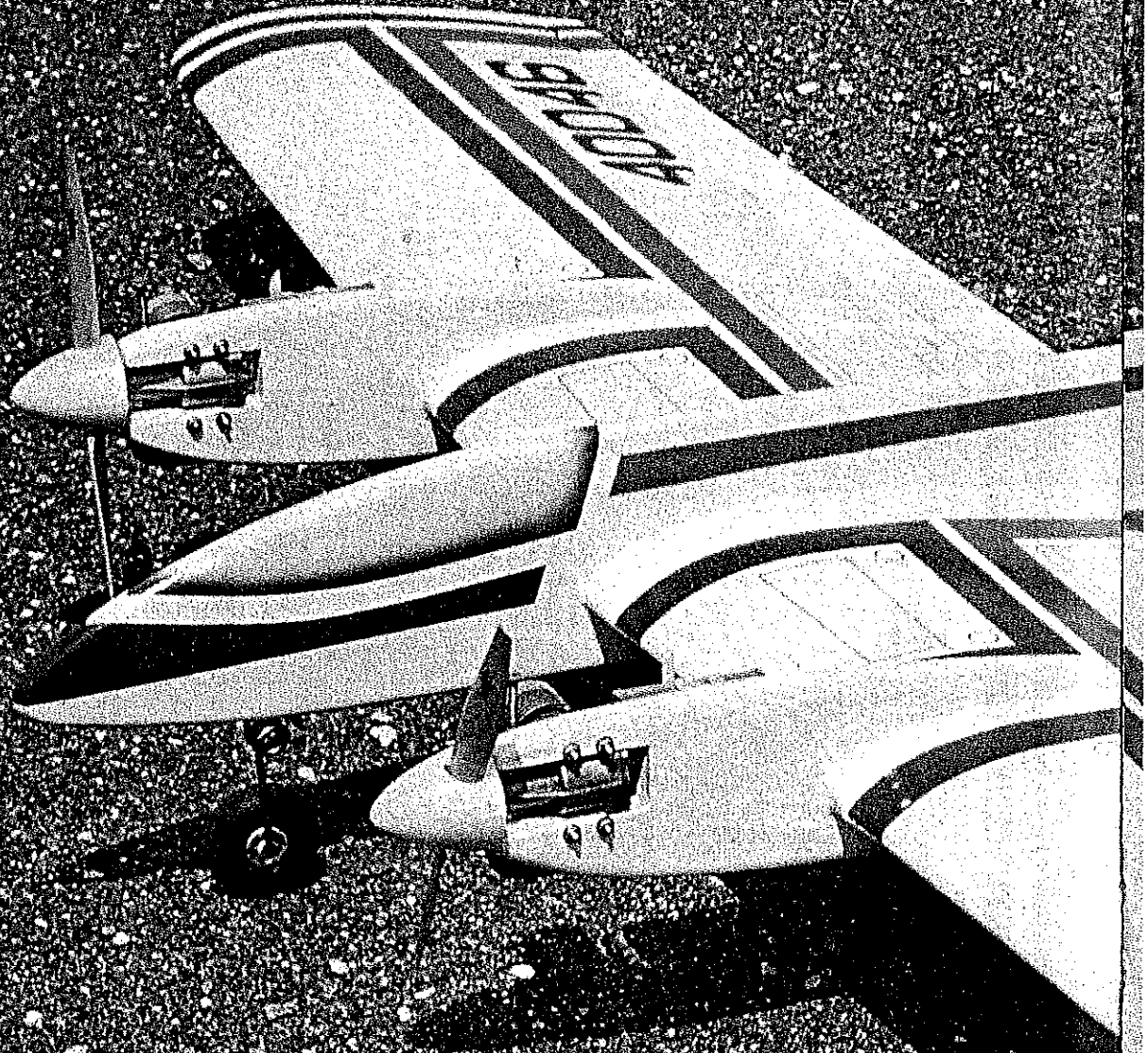
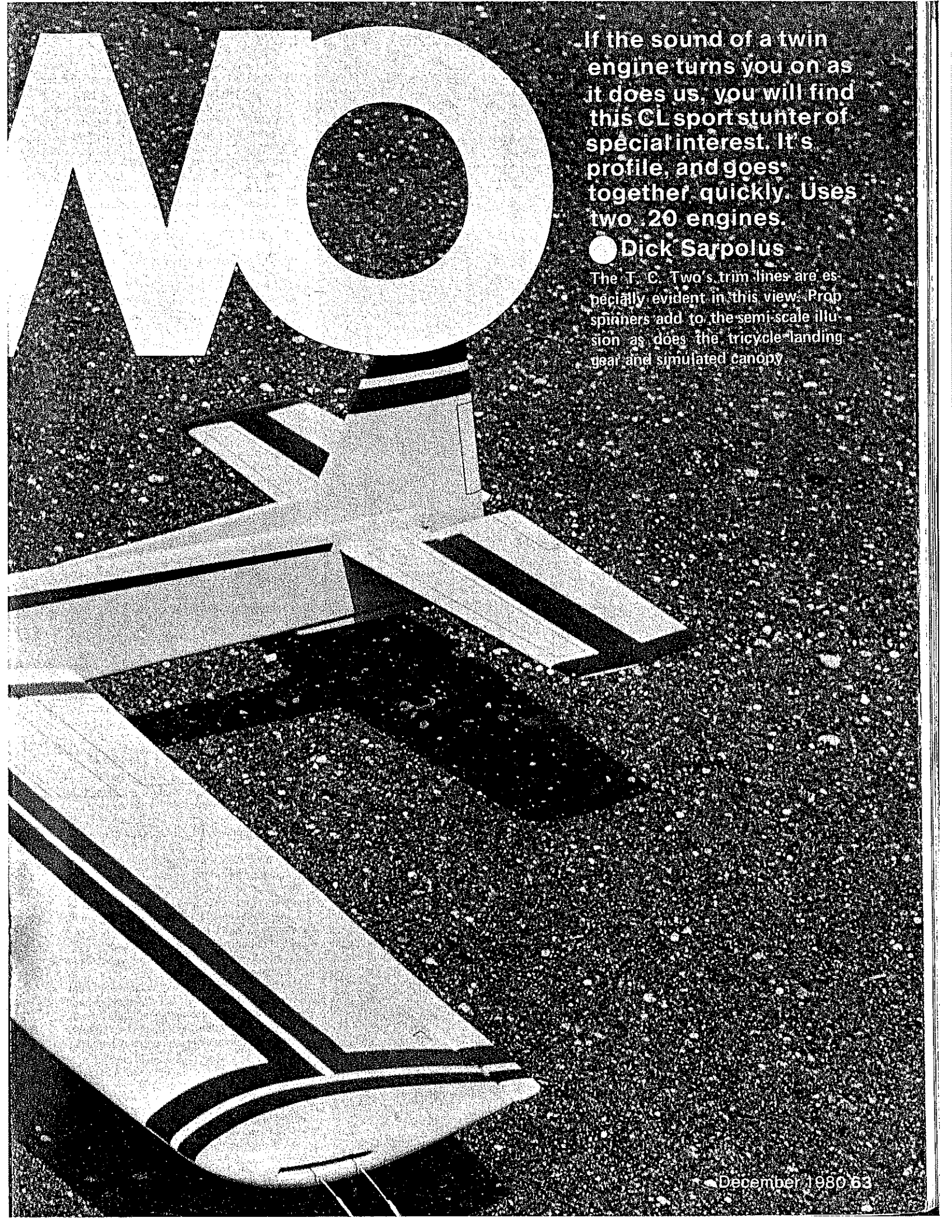


# TTCM

321

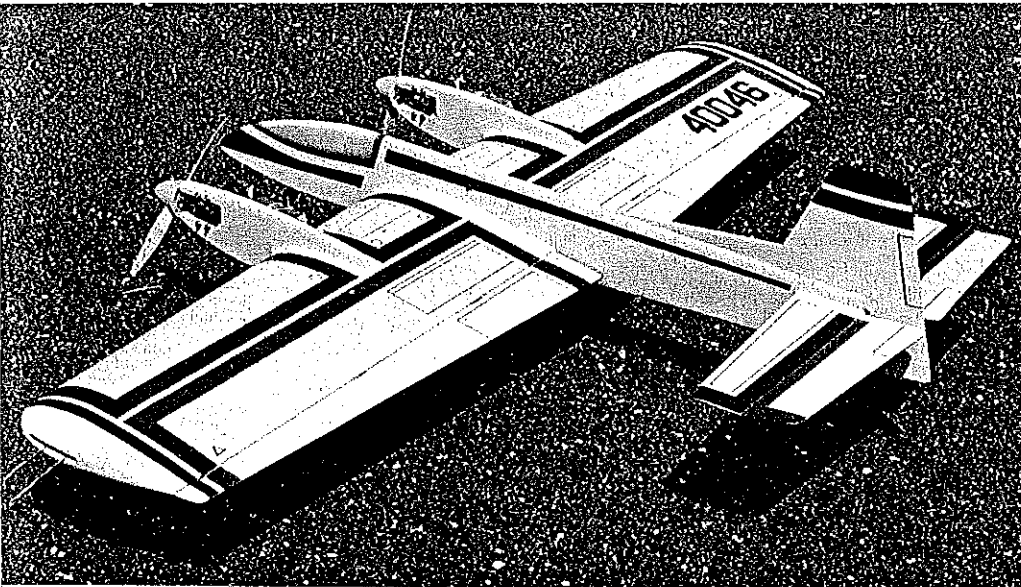




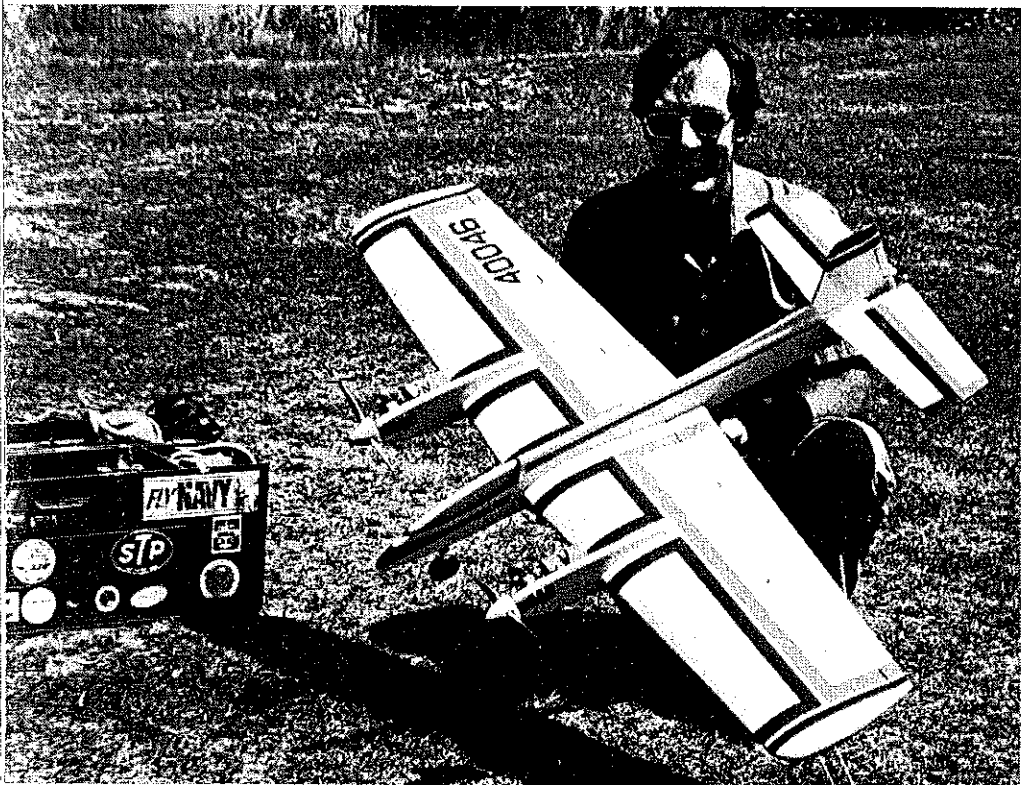
If the sound of a twin engine turns you on as it does us, you will find this CL sport stunter of special interest. It's profile, and goes together quickly. Uses two 20 engines.

● Dick Sarpolus

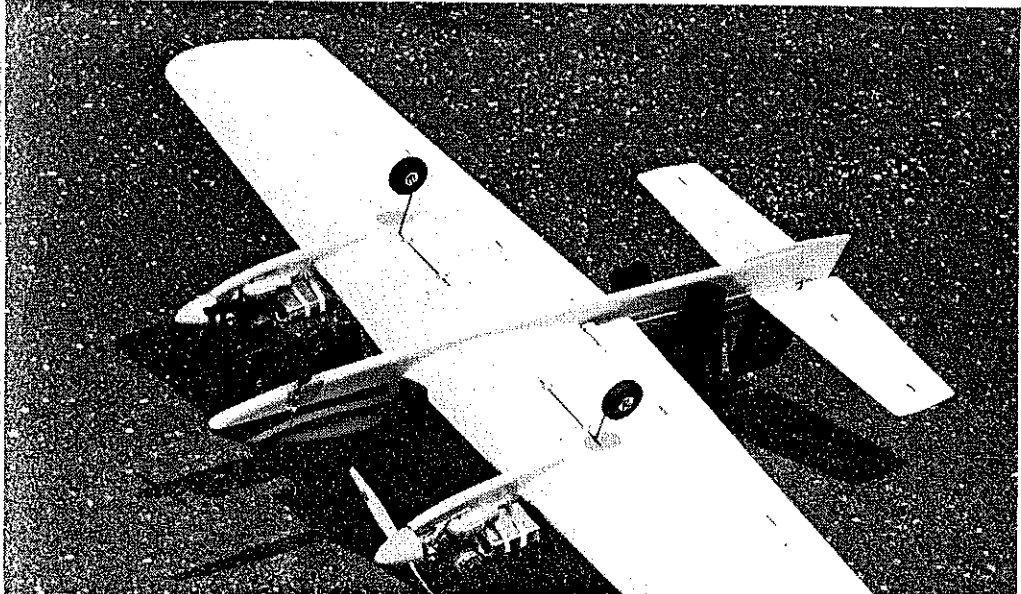
The T. C. Two's trim lines are especially evident in this view. Prop spinners add to the semi-scale illusion as does the tricycle landing gear and simulated canopy.



Fitted with wing flaps and two smooth-running engines, the T.C. Two is capable of any Precision Aerobatics maneuver in the book. With 53-in. span it's easy to transport, fun to fly.



The author with finished profile twin sport stunter at the flying field. With smile on his face, we know he is pleased with the results of his efforts. Sarpolus powered his with two OS .20s.



PROFILE MODELS are probably the most popular type of Control Line sport models flying today, and with good reason. They're easy and quick to build, they're rugged, they can look good, and they can perform well. Their continued commercial success over the years demonstrates this popularity with modelers; probably the longest running CL kit in history is a well known profile, Sterling's famous Ringmaster. I remember when the Ringmaster sold for \$2.98, which had to be more than a few years ago. It costs more than that, now, to buy a piece of 1/2-in. balsa for a fuselage, but profiles still provide a relatively low cost airplane.

With sheet balsa tail surfaces and a solid profile fuselage, that leaves only the framework construction of a wing to be concerned with. Cutting down on building time can provide the modeler with more time to experiment with design variations; if the profile flies well, then he can get serious and build the same design with a "real" fuselage. This is not to knock profiles, as many fliers prefer them, and build and fly nothing else.

The profile approach interested me when I wanted to get into another Control Line project — not just another stunter, but something different: a twin-engine aircraft. Profile construction would let me get a plane into the air quickly to enjoy some twin-engine flying without the work involved in more complex construction.

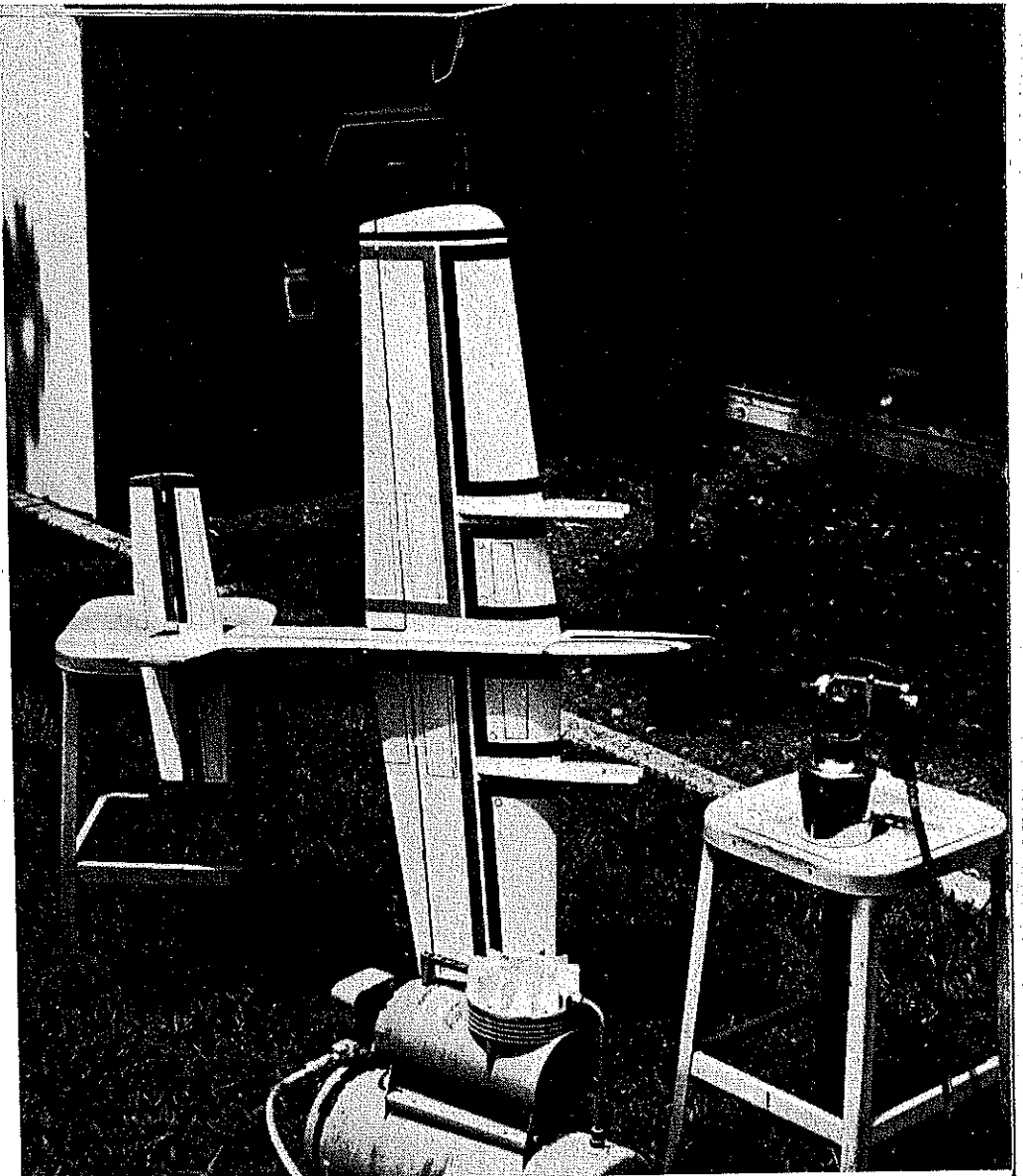
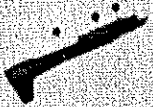
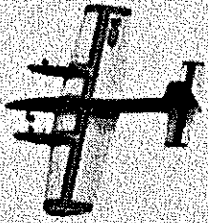
Twins aren't new, of course. Modelers have always liked that special twin "sound," the two engines roaring together. It adds something special to the fun of flying. In the 1950s, I build a twin CL aerobatic model with two Fox .35s and two profile fuselages. I took it to the Nationals, but its short career ended in a practice flight when the inboard engine quit at an inappropriate time. About six years ago, the twin urge hit again, resulting this time in a profile F-82 Twin Mustang, again with two Fox .35s. This was a good one, but a 63-in. wingspan model is tough to transport. The current twin, the subject of this article, is my favorite. At 53-in. wingspan and with two .20s, it's easy to move around, and above all, it's fun to fly.

Designing the T.C. Two began with the wing, the heart of any CL stunter. There's nothing new here, however, just the well proved approach of ample area, a thick airfoil, and plenty of flap area. The wingspan is 53 in.; airfoil thickness, disregarding the flaps, is 21%; the wing area is 575 sq. in., including 90 sq. in. of flap area. Construction employs the usual sheeted leading and trailing edges, two spars, cap-strips, block tips, etc.

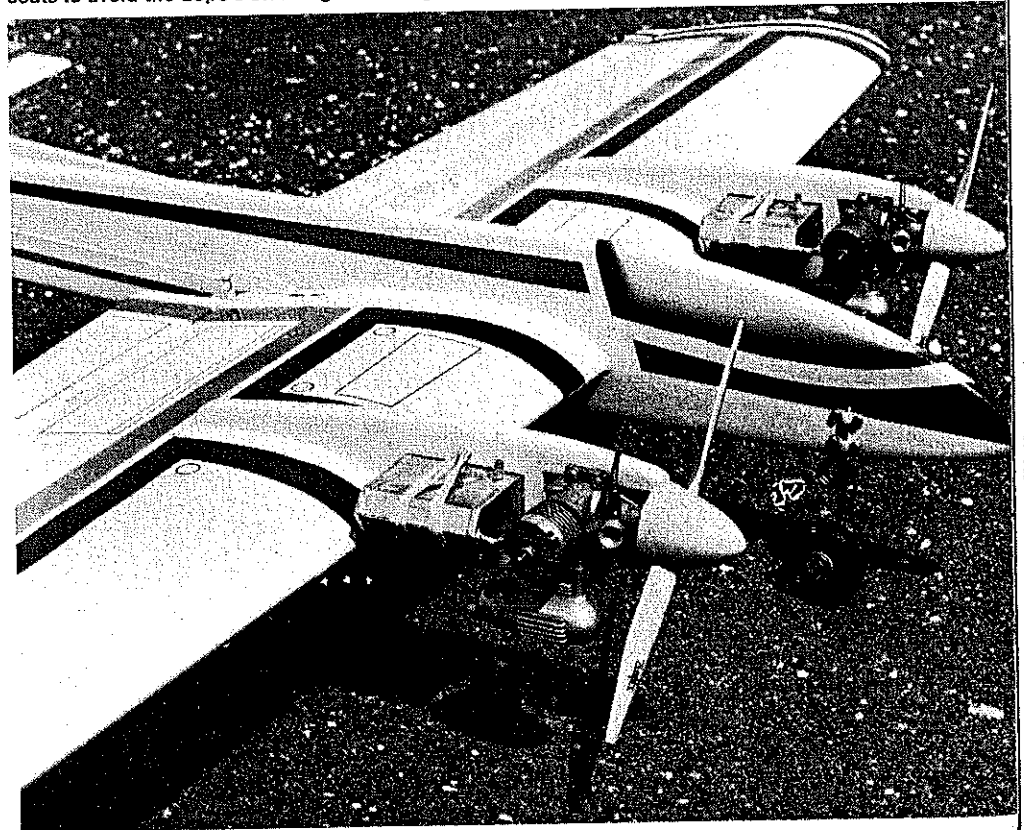
The horizontal tail area is 20% of the wing. Distance between flap hinge line and elevator hinge line is 15 in. A fuselage and engine nacelle design was worked out placing the engine thrust line and horizontal tail slightly above the wing. Tricycle gear was considered a must. Although most stunters are tail-draggers, I thought a twin just wouldn't look right without a trike gear.

Engine selection was easy, as there are many good .19 or .20 engines on the market today suitable for Control Line use, such as Fox, OS, Supertigre, Enya, or K&B. I believe that all are available without carburetors, and with mufflers. The OS .20s I used, purchased several years ago, came equipped with carburetors and plain venturi intakes for either type of operation.

Bottom view shows placement of the tricycle landing gear. Grooved 3/8 x 3/4-in. hardwood blocks, in conjunction with 1/32 plywood rib doublers, take the load of the rearward landing gear struts.



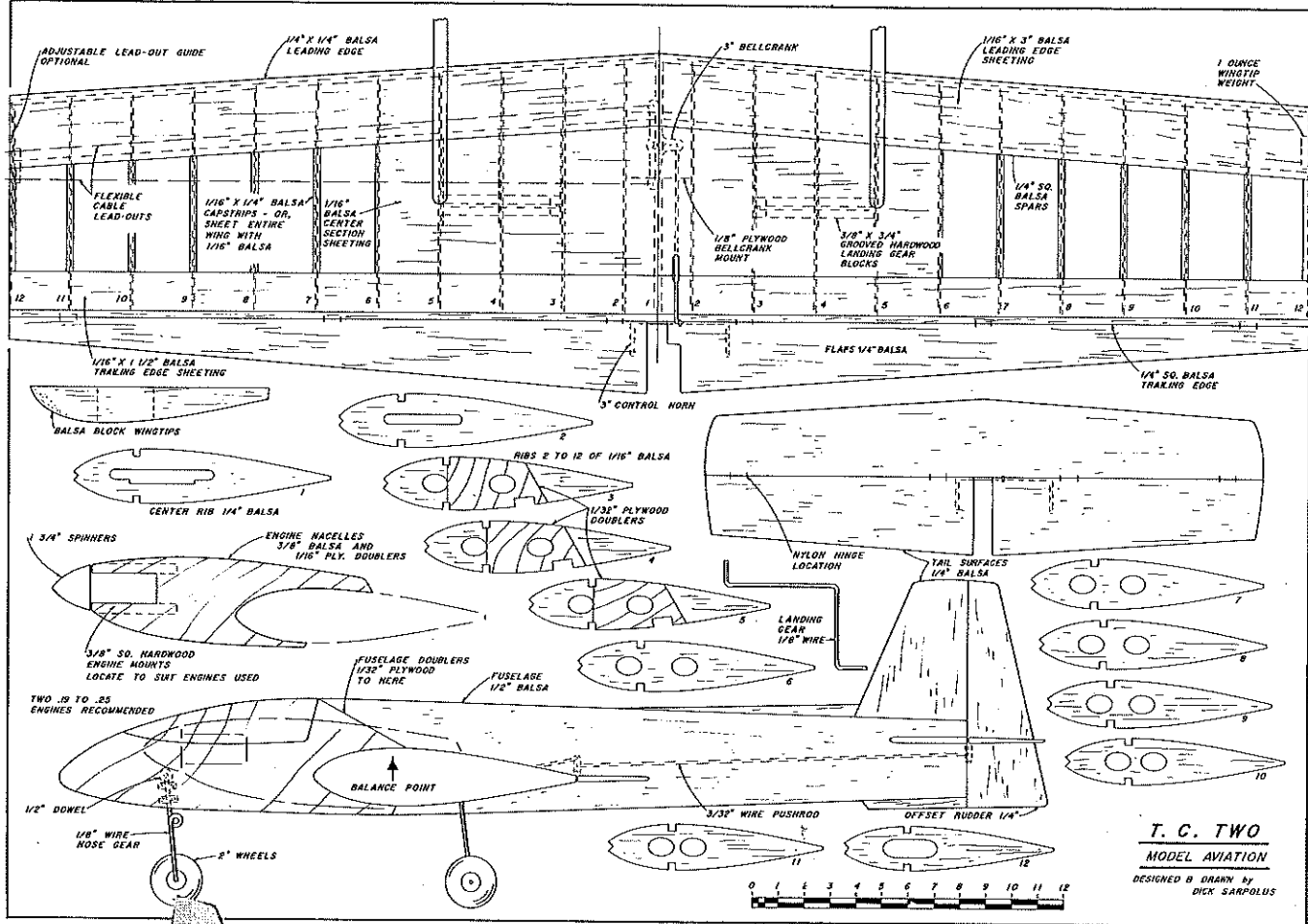
Wings covered with iron-on Silkspun Coverite. Setup here was for outside spraying of clear top coats to avoid the dope's blushing due to high humidity; working in bright sun did the trick.



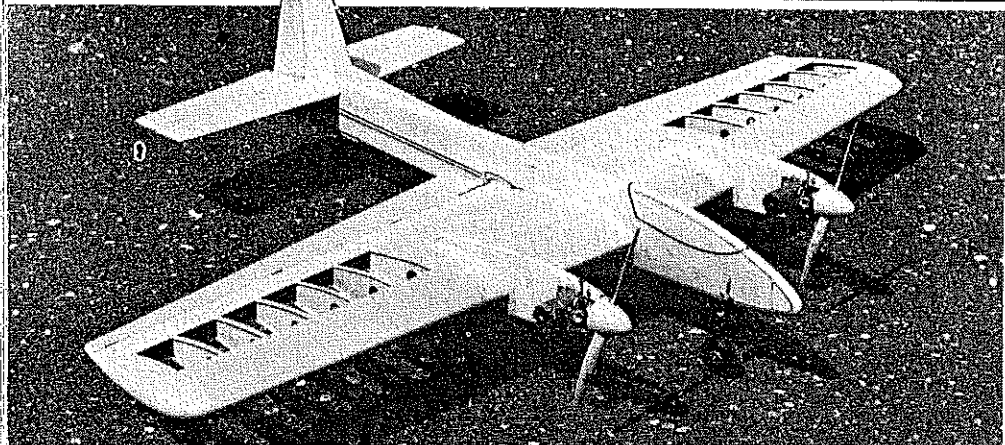
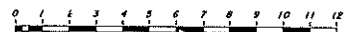
Does the T.C. Two fly? You bet! Loops, wing-overs, eights—just about any maneuver—can be done with this neat looking/sounding plane.

The mufflers are a little larger and heavier than many of the custom types used by the top Precision Aerobatics fliers, but they work fine for sport flying. Fuel tanks used are Fox 2½ ounce, 2-in. wide square wedge models.

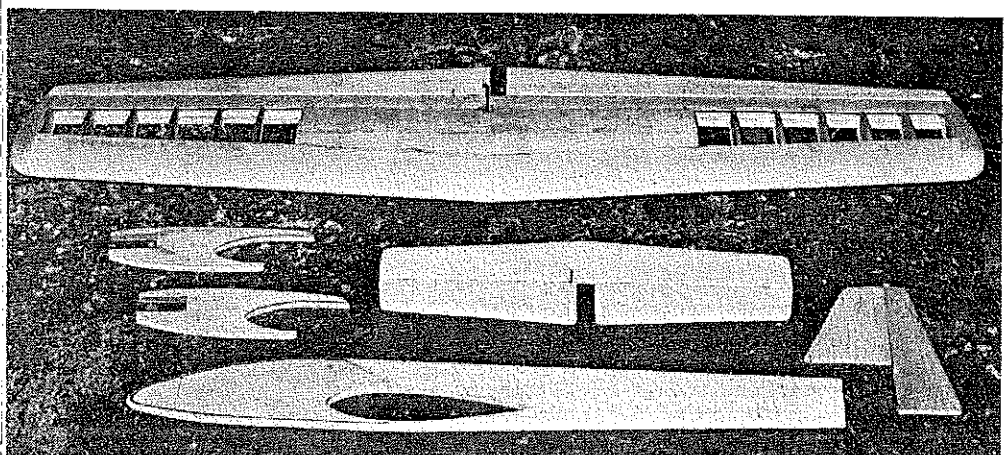
Mufflers, to maintain peace with the flying field neighbors, are a must. Stock OS mufflers were used by the author. Fuel tanks, rubber-banded in place, are 2½-oz., 2-in. wide, by Fox.



T. C. TWO  
 MODEL AVIATION  
 DESIGNED & DRAWN BY  
 DIK SARPOLUS



Finished structure ready for covering and painting. As is evident, she's not tough to build. If you don't like cutting out individual wing ribs, author suggests "sandwich" method.



Wing construction is typical for model type, but fuselage, nacelles and tail feathers are as simple as they come. Suggestion: make a kit, by cutting out all parts, before any assembly.

This may be a good spot to suggest that anyone interested in CL Precision Aerobatics flying should join PAMPA, the Precision Aerobatics Model Pilots Association. Not an organization just for experts, their newsletter alone, *Stunt News*, is worth the membership cost for the information it provides to the enthusiast. Write to: Wynn Paul, 1640 Maywick Dr., Lexington, KY 40504.

Flying the completed plane showed that a twin-engine aerobatics model could certainly compete with the conventional single-engined jobs. This plane, of course, wouldn't equal a top model such as Bob Hunt's sophisticated Genesis, but as it is, it's fine for casual aerobatics pattern flying. I have no doubt that a "full house" twin would be competitive with any single-engined model. I enjoy the sound of the two engines, and the different appearance of the twin—well worth the slight added work and expense.

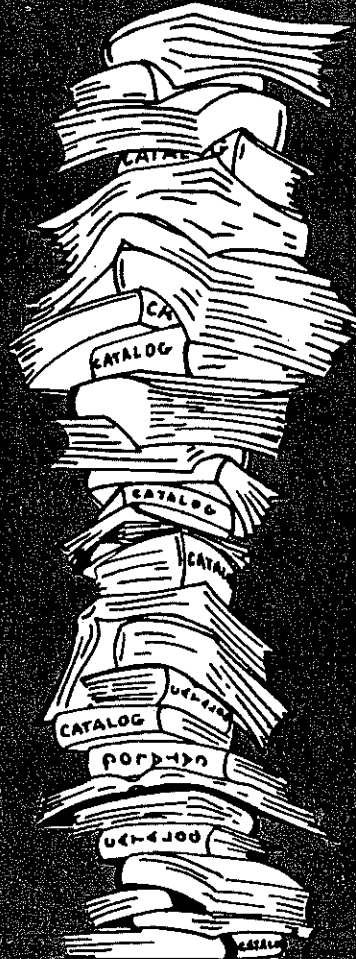
Discussion of the plane's construction won't take too long, because of its basic simplicity. As usual, I recommend cutting out all parts beforehand, so the construction can proceed smoothly. In other words, make your own kit.

Starting with the wing, if you don't want to cut out the ribs one at a time, use the sandwich method. Make a root and tip rib pattern from plywood or aluminum, sandwich balsa rib blanks between the patterns, and cut/sand to shape. If you don't like either method, order a Sig Super Chipmunk wing kit; then, by making the one center rib, positioning the ribs over these plans for assembly, and adding the landing gear blocks and their reinforcements, you'll have a wing for this twin.

Build the wing first. It's important to make a straight, warp-free structure. This can be done

*Continued on page 124*

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the winning Paper Stick exceeded his time. That is, he could have placed second in the Paper Stick event!

A couple of other models had times nearly as good as Earl's, but they were microfilm EZBs. In Junior EZB, the times were very good, particularly for the top two places. Winner was Michael Van Gorder, with Mike Clem close behind. Mike's time was a whopping 12:31!

Historically, the EZB was to be an easy-to-build, small, microfilm event. Specifications included: no curves in the outlines, no external bracing, solid motor stick, all-wood propeller, 3-in. maximum chord, and an 18-in. maximum span. Such a model is easy to build, easy to transport, fun to fly, and capable of surprising duration. Earl Hoffman, of California, has done over 26 minutes with one! Somewhere along the line, modelers began requiring tissue covering rather than microfilm. That is not so bad,

except that out West, where we sometimes have very low humidity, the tissue shrinks and warps the models badly. The event got written into the AMA rule book and, incredibly, the first two specifications were left out! How or why is most difficult to understand or accept. Everyone who I spoke with lamented the current rules and wanted to return to the old ones. Dick Hardcastle agreed to write up a proposal to change the present rules so that we can get back to the type of model we are accustomed to and like.

Manhattan Cabin was an unofficial event that saw a close battle between Wayne Zink and Ron Ganser, with Wayne finally winning with 7:33. That was a rather good time for this class of rather heavy model that must also take off from the floor.

On this note, the Indoor events of the 1980 Nats ended. It was good competition and lots

of fun. It was great to renew old acquaintances and talk over old times, as well as to fly. We all owe thanks to the officials who kept the records and made things go. Also, there are always a number of modelers who come by just to watch and to time flights, and they are really a great help in such a meet!

**T.C. 2/Sarpolus**

*Continued from page 66*

by selecting firm, straight spars, and blocking the ribs up firmly and carefully on a flat building board. When the wing is removed from the board, it shouldn't have any built-up warps. Pin the bottom spar down over the plans, add the ribs and top spar, blocking the ribs off the board to keep them level. Add the leading edge, leading and trailing edge sheeting, then remove the wing panel from the board, flip it over, and add the opposite side sheeting. Join the two wing panels, install the bellcrank and its linkage, and sheet the center section. Wing tips are cut and sanded to shape from soft, light balsa.

The tail surfaces are simply cut to shape from sheet balsa. The edges should be sanded to shape, and the elevators tapered as shown on the plans. All hinges are nylon; they should be recessed on the elevators and flaps to permit as small a gap as possible when these control surfaces are installed.

The engine nacelles and fuselage are of typical profile construction: balsa core with plywood doublers. The nacelles are cut from  $\frac{3}{8}$  balsa with  $\frac{3}{8}$  square hardwood engine mounts glued into them. Their doublers are cut from 1/16 plywood, which is heavy enough for use with .20-size engines. To assemble the nacelles, I use epoxy glue for strength and resistance to vibration.

The fuselage is cut from  $\frac{1}{2}$ -in. balsa, a typical profile, and plywood doublers only 1/32-in. thick are used to save weight; heavier doublers are not needed, as there is no engine in this fuselage. A piece of  $\frac{1}{2}$ -in. dowel is glued into the fuselage before the doublers are added, to receive the wire nose landing gear.

With the edges of the fuselage and the nacelles well sanded, final assembly can begin. The fuselage is located on the wing, exactly perpendicular to the wing trailing edge, and glued in place. The engine nacelles are epoxied in place, again being sure to keep them perpendicular to the wing trailing edge. The tail surfaces are added, blocking the fuselage and wing level, and measuring carefully to get the horizontal stabilizer straight, the rudder vertical, etc. Proper alignment helps to ensure a good flying plane. Reinforcing the nacelle/wing joint with fiberglass cloth and epoxy will result in a long-lasting model.

Final details include fabrication and installation of the landing gears with their retainers, bending the 3/32 wire pushrod, slotting the surfaces for the nylon hinges, screw-eyes for rubberband fuel tank retainers, etc. I disassemble the model as much as possible for covering and painting; when finished, the control surfaces are installed, epoxying the hinges and control horns in place. The wings were covered with iron-on Silkspun Coverite, using Balsarite first for easy adhesion.

The finish I used makes this a Sig job almost all the way. Sig balsa was used for construction, Sig sanding sealer and clear dope for surface preparation, and Sig butyrate color dope for the final finish. The model did turn out slightly nose-heavy; particularly if planning to use engines any heavier than the OS .20s, I would

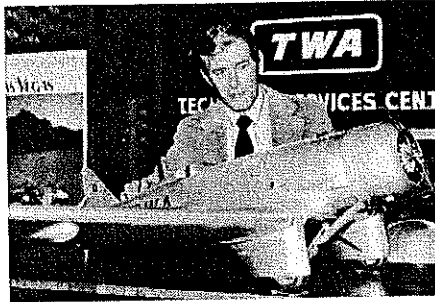
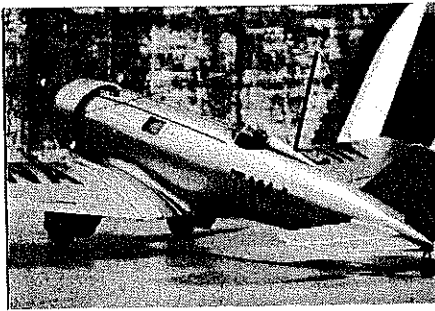
suggest shortening the engine nacelles by 1/2-in. or 3/4-in. to permit proper balance, without adding tail weight.

A comment about the name: I have a young friend, Trent Charles, affectionately known as T.C., and I thought he'd like an airplane named after him—so, the T.C. Two.

What do we have here? A good-sized profile model, easy to build quickly, offering good aerobatic performance, plus the thrill and excitement only a twin-engined model can give. We're pleased with it; try it, you'll like it, too.

## Letters to the Editor

Continued from page 4



cept, planked with balsa. Covering is silver (non-shrink) Mylar, with scale rivet spacing from the "sticky" side before applying.

A word of caution about flying the scale Alpha: the center wing section has such a terrific amount of lift that the model will become airborne before the ailerons are effective, unless you hold it on the ground until you have plenty of speed.

Anyway, hope you might find a slot for maybe one picture somewhere in a future issue.

Eldon D. Dobbe  
Faucett, MO

*Better than that, we're printing two pictures. And we're checking to see if Mr. Dobbe might develop a construction article for printing later.*

## Likes For Fun, Drake

I read, with great interest, the "Just For the Fun of It" feature in the October issue of *Model Aviation*. I think that it's the best part of the magazine. I especially enjoyed the article on Luther Hux's indoor RC balloon, and am looking forward to future articles of this type.

I also enjoyed the construction article, Ken Willard's Drake II. I would like to build a half-A-size version of this aircraft. Perhaps you might know where I could find the original 1951 plans for the 36-in. span version. It would make an interesting winter project.

In closing, I would just like to say what a great organization the AMA is. As a beginner in RC, I would have had great difficulty getting started were it not for the AMA. Thank you, and keep up the good work!

Continued on page 127

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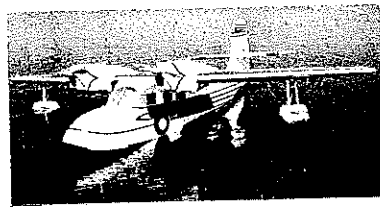
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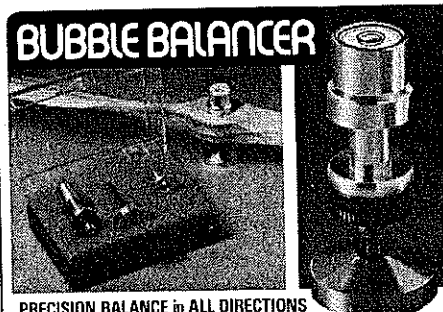
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